Agricultural R&D Indicators Factsheet | September 2014

TURKEY

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KEY INDICATORS, 2009–2012

Total Public Agricultural Research Spending	2009		2012
Turkish lira (million constant 2005 prices)	338.5		337.5
PPP dollars (million constant 2005 prices)	407.5		406.3
Overall Growth		**0%**	
Total Number of Public Agricultural Researchers			
Full-time equivalents (FTEs)	2,581.8		3,009.4
Overall Growth		**17%**	
Agricultural Research Intensity			
Spending as a share of agricultural GDP	0.59%		0.51%
FTE researchers per 100,000 farmers	31.84		38.54

Notes: Acronyms, definitions, and an overview of agricultural R&D agencies are available on page 4. All indicators on this page exclude agricultural R&D performed by the private sector.

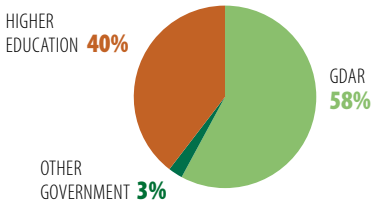
- Turkey's total number of agricultural researchers (in FTEs) grew considerably during 2009–2012. At GDAR agencies, this growth mostly represented increased numbers of MSc-qualified scientists, whereas at the universities the increase was predominantly in PhD-qualified scientists.
- The 2011 restructuring of Turkey's agricultural ministry led to a stronger government commitment to agricultural R&D, but the level of investment as a share of AgGDP remains relatively low, particularly compared with average shares of most European Union countries.
- Most of Turkey's agricultural R&D is funded by the government, either directly through the Ministry of Agriculture or through competitive grants issued by TÜBİTAK. The role of the private sector has become increasingly important over time, in terms of the actual conduct of agricultural R&D, as well as funding for public-sector research.

FINANCIAL RESOURCES, 2012

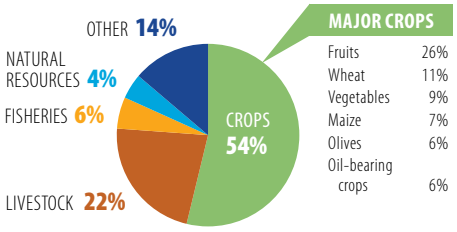
Spending Allocation	
Salaries	72%
Operating and program costs	20%
Capital investments	7%
Funding Sources	
Government	92%
Sales of goods and services	7%
Other	1%

Note: Due to lack of availability, financial data exclude the higher education sector.

INSTITUTIONAL PROFILE, 2012



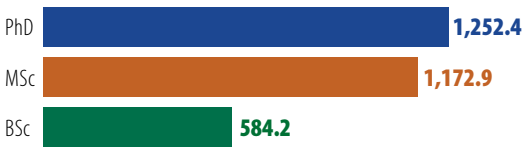
RESEARCH FOCUS, 2012



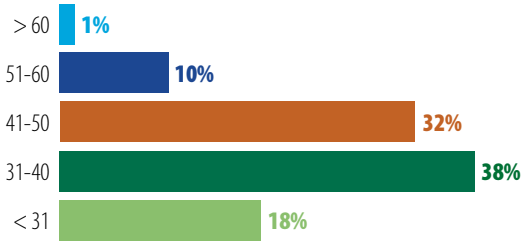
Notes: Major crops include those that are the focus of at least 5 percent of all crop researchers; 35 percent of total crop researchers focused on a wide variety of other crops.

RESEARCHER PROFILE, 2012

Number by qualification (FTEs)



Share by age group (years)



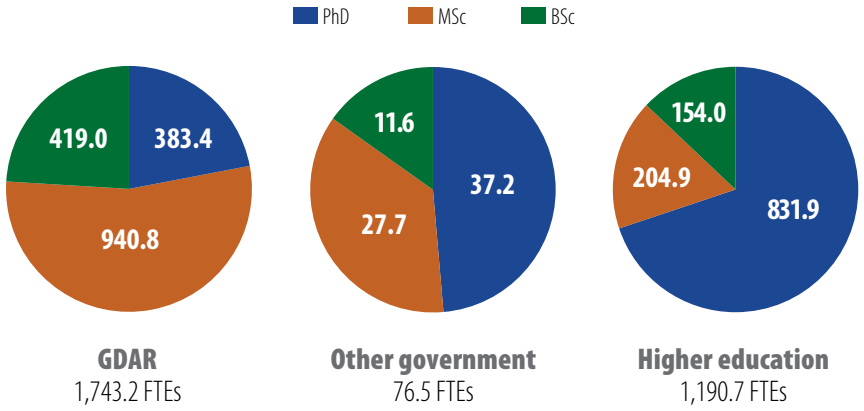
CHALLENGE

- Research entities under the GDAR umbrella are severely challenged in retaining PhD-qualified researchers because promotional opportunities are nonexistent beyond the "associate professor" level. The lack of opportunity for career advancement within GDAR has driven many of its senior researchers into the higher education or private sectors, despite GDAR's superior research infrastructure and equipment.

POLICY OPTION

- The government needs to address disparities in the employment status and promotional opportunities of agricultural Turkey's scientists to enable GDAR agencies to successfully compete for and retain well-qualified staff. Sufficient financial resources will need to be made available to facilitate further training for the new (predominantly MSc- and BSc-qualified) recruits, and to provide the necessary conditions to motivate them and secure their commitment over time.

Distribution of agricultural researchers by institutional category and degree qualification, 2012 (FTEs)



Note: Other government includes TÜBİTAK and SUEN. Staff data have been adjusted to account for the proportion of time researchers spent on agricultural research-related activities, as opposed to teaching, extension, nonagricultural research, or other activities.

In 2012, GDAR agencies employed a combined total of 383 FTE researchers with PhD degrees, 16 of whom held associate professor positions. Given the lack of promotional opportunities beyond this level, the majority of agricultural scientists with PhD degrees in Turkey are employed in the higher education sector. In 2012, 70 percent of university-based agricultural scientists were trained to the PhD level. The bulk of MSc- and BSc-qualified scientists in the higher education sector are younger than 30 years old and have ample opportunity to upgrade their qualification levels in the medium term.

RECENT POLICY REFORMS STRENGTHEN AGRICULTURAL RESEARCH

In 2011, the former Ministry of Agriculture and Rural Affairs was reorganized to form the Ministry of Food, Agriculture, and Livestock. With that change, a number of ambitious plans and strategies for the agricultural sector were launched, including doubling the country's agricultural GDP by 2023. The important role of agricultural R&D in attaining these targets was clearly recognized and translated into a higher financial commitment to agencies under the GDAR umbrella, and large-scale recruitment of researchers. Physical infrastructure was also upgraded, and universities and private companies were given access to GDAR's research stations. A number of advanced R&D centers were established, including one of the world's largest genebanks, a drought testing center, a poultry development center, a center for medicinal and aromatic plants, and a biomass energy research center. In addition, new agricultural training centers were established in Izmir, Diyarbakır, and Şanlıurfa.

CROSS-COUNTRY COMPARISONS OF KEY INDICATORS

	Total number of researchers, 2012 (FTEs)	Growth in number of researchers, 2009–2012	Share of PhD researchers, 2012 (FTEs)
Turkey	**3,009.4**	**17%**	**42%**
Lebanon	209.2	61%	45%
Tunisia	541.6	26%	62%
Oman	243.6	26%	26%

Note: Indicators in this table exclude agricultural R&D performed by the private sector.

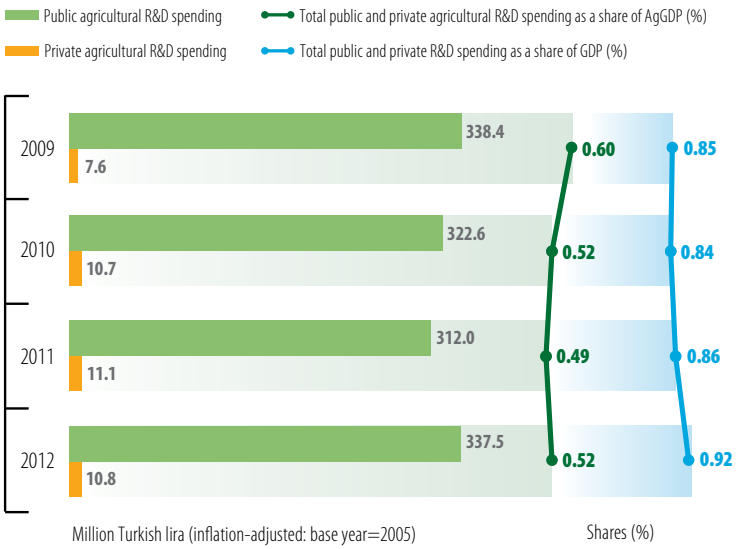
CHALLENGE

- In 2012, (public and private) agricultural R&D spending as a share of AgGDP totaled just 0.52 percent. Turkey has set itself the target of investing 3 percent of overall GDP in R&D by 2023, the republic's 100th anniversary. The country still has a long way to go to reach this ambitious target, both in agricultural R&D and other areas of R&D.

POLICY OPTION

- Despite tremendous progress in recent years, much more government support for agricultural R&D is needed if the 3-percent investment target is to be met. In addition, GDAR agencies and the universities need more encouragement to generate complementary funding through channels other than the government. Private-sector involvement in agricultural research—which is limited compared with other areas of research—also needs to be stimulated, for example, through tax incentives and subsidies, and by simplifying the lengthy administrative procedures associated with registering new varieties.

Agricultural R&D spending and intensity ratios, 2009–2012



Agriculture continues to lag behind other sectors of the Turkish economy when it comes to R&D investment. In 2012, Turkey invested 0.92 percent of its GDP in public and private R&D, which is considerably higher than its comparable investment in agricultural R&D. Furthermore, private R&D accounted for nearly half the country's total R&D investment in 2012, but it represented less than 4 percent of agricultural R&D investment that year.

Notes: Data on overall R&D spending as a share of GDP are from TurkStat. Agricultural R&D spending data are from ASTI. ASTI's agricultural R&D intensity ratios are considerably lower than those published by TurkStat as the latter include investments agrochemicals and food processing research, which are not classified as "agriculture" under official FAO definitions.

LIMITED BUT GROWING PRIVATE-SECTOR INVOLVEMENT IN AGRICULTURAL R&D

It is difficult to quantify the private sector's role in agricultural R&D in Turkey. Although the vast majority of companies import, test, and register seed, this does not constitute active engagement in the conduct of agricultural research. About 35 companies—mainly in the food crop and seed sectors—have only recently begun conducting (limited) agricultural R&D. Given high startup costs, most of these companies lack the resources necessary to recruit full-time researchers, so they engage GDAR- or university-based researchers through short-term consultancies (providing a valuable source of additional revenue to those agencies). Despite having comparatively limited involvement in agricultural R&D to date, private companies play a key role in releasing new varieties. Of the 2,063 new crop varieties released in Turkey during 2002–2012, 1,015 (49 percent) were from the private sector, 897 (44 percent) were from GDAR agencies, 102 (5 percent) were from the higher education sector, and 49 (2 percent) were from other public organizations.

In 2012, recognizing the potential of privately funded and performed agricultural R&D, Turkey introduced extensive incentives to stimulate investment, including tax and social security-premium exemptions, and the launch of a fund for technology initiatives. As of 2014, additional draft legislation includes tax exemptions on the sale and lease of R&D-driven inventions, and corporate tax exemptions on at least half the income generated by such inventions. In addition, the draft legislation proposes to reduce the minimum number of R&D staff required for companies to be able to take advantage of other legal benefits from 50 to 30 employees.

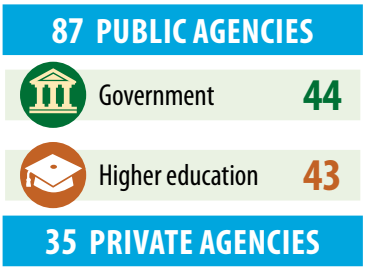
CROSS-COUNTRY COMPARISONS OF KEY INDICATORS *continued*

	Total spending, 2012 (million 2005 PPP dollars)	Overall spending growth, 2009–2012	Spending as a share of AgGDP, 2012
Turkey	**406.3**	**0%**	**0.51**
Lebanon	34.1	57%	0.95
Tunisia	55.9	13%	0.64
Oman	97.0	19%	6.51

Note: Indicators in this table exclude agricultural R&D performed by the private sector.

OVERVIEW OF TURKEY'S AGRICULTURAL RESEARCH AGENCIES

More than 120 public- and private-sector agencies conduct agricultural R&D in Turkey. Headquartered in Ankara and overseeing a large number of research institutes, the country's principal agricultural R&D entity is GDAR. Its agencies (employing a combined total of 1,743 FTE researchers in 2012) conduct research on crops, livestock, fisheries, postharvest technologies, soil and water resources, and rural development. The largest of GDAR's institutes are the West Mediterranean Agricultural Research Institute (102 FTEs), the Central Research Institute for Field Crops (93 FTEs), the Bahri Dağdaş International Agricultural Research Institute (67 FTEs), and the Southeast Anatolia Agricultural Research Institute (67 FTEs). TÜBİTAK, a government agency separate from GDAR, acts as an advisory agency to the Turkish government on issues related to (agricultural and nonagricultural) science and research, and competitive funding for public and private research. TÜBİTAK also conducts its own research in areas of strategic priority, and employs more than 1,500 researchers. Of these, 76 FTEs were involved in crop, livestock, and natural resources research in 2012. Forty-three higher education agencies are actively engaged in agricultural R&D in Turkey. The five largest include the faculties of agriculture of Suleyman Demırel University (110 FTEs), Ankara University (82 FTEs), Ege University (78 FTEs), Atatürk University (68 FTEs), and Çukurova University (64 FTEs). The private sector plays an increasingly important role in Turkish agricultural R&D. Although most companies are only involved in a limited amount of (largely ad hoc) research, MayAgro Seed and Asgen Tarım (50 and 27 FTEs, respectively) reported sizable research programs.



For a complete list of the agencies included in ASTI's dataset for Turkey, visit **www.asti.cgiar.org/turkey.**

ASTI DATA PROCEDURES AND METHODOLOGIES

- The **data underlying this factsheet** were predominantly derived through primary surveys, although some data were drawn from secondary sources or were estimated.
- **Public agricultural research** includes research conducted by government agencies, higher education agencies, and nonprofit institutions.
- ASTI bases its calculations of human resource and financial data on **full-time equivalent (FTE) researchers**, which take into account the proportion of time staff actually spend on research compared with other activities.
- ASTI presents its financial data in 2005 local currencies and **2005 purchasing power parity (PPP) dollars**. PPPs reflect the relative purchasing power of currencies more effectively than do standard exchange rates because they compare prices of a broader range of local—as opposed to internationally traded—goods and services.
- ASTI estimates the **higher education sector's research expenditures** because it is not possible to isolate them from the sector's other expenditures.
- Note that, due to **decimal rounding**, the percentages presented can sum to more than 100.

For more information on ASTI's data procedures and methodology, visit **www.asti.cgiar.org/methodology;** *for more information on agricultural R&D in Turkey, visit* **www.asti.cgiar.org/turkey.**

ACRONYMS USED IN THIS FACTSHEET

AgGDP	Agricultural gross domestic product
FAO	Food and Agriculture Organization of the United Nations
FTE(s)	Full-time equivalent (researchers)
GDAR	General Directorate of Agricultural Research
PPP(s)	Purchasing power parity (exchange rates)
R&D	Research and development
SUEN	Turkish Water Institute
TÜBİTAK	Scientific and Technological Research Council of Turkey
TurkStat	Turkish Statistical Institute

ABOUT ASTI, IFPRI, AND GDAR

Working through collaborative alliances with numerous national and regional R&D agencies and international institutions, **Agricultural Science and Technology Indicators (ASTI)** is a comprehensive and trusted source of information on agricultural R&D systems across the developing world. ASTI is led by the **International Food Policy Research Institute (IFPRI)**, which—as a CGIAR member—provides evidence-based policy solutions to sustainably end hunger and malnutrition and reduce poverty. The **General Directorate of Agricultural Research (GDAR)** implements and coordinates agricultural R&D in Turkey and oversees a network of institutes that conduct research on agriculture, natural resources, and food technology. GDAR is administered by the Ministry of Food, Agriculture, and Livestock.

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